



EA Engineering, Science, and Technology, Inc., PBC

405 S. Highway 121 (Bypass)
Building C, Suite 100
Lewisville, TX 75067
Telephone: 972-315-3922
Fax: 972-315-5181
www.eaest.com

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Ms. Katrina Higgins-Coltrain
Task Order Monitor
U.S. Environmental Protection Agency (EPA)
1201 Elm Street, Suite 500, SEDRL
Dallas, Texas 75270-2102

RE: Responses to Comments on the Soil Feasibility Study Report, Revision 00
Wilcox Oil Company Superfund Site
Remedial Investigation/Feasibility Study
Remedial Action Contract 2
Contract: EP-W-06-004
Task Order: 0128-RICO-06GG

Dear Ms. Higgins-Coltrain:

EA Engineering, Science, and Technology, Inc., PBC (EA) has prepared the following responses to comments on the Soil Feasibility Study Report, Revision 00. Comments from EPA were received on 24 February 2021 and 3 March 2021, and comments from Oklahoma's Department of Environmental Quality (DEQ) were received on 26 February 2021.

EPA Comments Received via Email on 24 February 2020

1. *The PRG memos for HH and ECO need to be included as attachments or appendices.*

EA Response: The PRG technical memorandum has been added within the report.

2. *Section 2 (an example report is provided for reference): This section needs to be re-structured. There needs to be a summary of activities from the start to finish that show how the data were gathered, how the data were evaluated in the risk assessments, and then how those data along with the risk assessment results identified the COPCs. This list of COPCs should be the only list discussed in the FS and there should be no further discussion of the RSLs.*

EA Response: The section has been revised to add details of activities according to the comment.

- *Section 2.7: out of place. Much of this information can be provided under the technology evaluation portion of the report.*

EA Response: The section has been deleted and incorporated in the other section.

- *Add Section summarizing the HHRA: scenarios evaluated, where risk was identified and the list of COPCs, and the refinement provided in the PRG memo.*

EA Response: HHRA details have been added in Section 2.



- *Add Section summarizing the ECO risk: scenarios evaluated, where risk was identified and the list of COPCs, and the refinement provided in the PRG memo.*

EA Response: A subsection has been added to include ecological risk assessment findings.

- *Section 2.8 should not be here, but should be in the GW technology section of the report or the screening section of the report.*

EA Response: This section has been moved to a new section, Section 3, in the revised FS Report per the discussion during the meeting with EPA on 8 March 2021.

3. *Section 2.1, East Tank Farm: all residential properties are occupied. Please revise text.*

EA Response: The revision has been made.

4. *Section 2.2.2, revise the last two sentences to the following: “This source control action is an early/interim action that does not constitute the final remedy for the Site, therefore, any subsequent actions to address the remaining risks and threats posed by the site conditions will be documented in a final Site-wide decision document. This FS Report provides support for the Site-wide decision document.”*

EA Response: The revision has been made.

5. *Section 2.3:*

- *Paragraph 3, Revise text: Replace loading dock area with Lorraine Process area.*
- *Paragraph 4: Revise sentence to the following: “Storage tanks, refinery-related debris and piping still remain in the Wilcox Process Area while evidence remains of former tank berms that were cut and leveled in the East Tank Farm (EA 2020a).”*

EA Response: The revisions have been made.

6. *Section 2.4:*

- *this is not correct. Reference email and summary sent on 10-2-20: “The assumption is that the ETF, LPA, and the residential properties in the WPA will be used for residential in the future. The remaining portion of Wilcox is assumed to be industrial and the 400 mg/kg lead PRG will apply.”*
- *Additionally, reference section 3.6.2 in the RI. Use the language already developed.*

EA Response: The first two comments have been addressed, and the text has been revised as follows:

“Residential use is expected to continue for all residential properties in the East Tank Farm, Lorraine Process Area, and Wilcox Process Area. A large portion of the East Tank Farm, currently used for grazing, may be used as a residential property in the future based on discussions with the current landowner.



The remaining portion of the Wilcox Process Area consists of the remaining refinery structures and features, which are currently unused. It is likely that the anticipated reuse for this property would be industrial.”

- *Revise second paragraph to the following: “Residential properties associated with the North Tank Farm, the Lorraine Process Area and the Wilcox process area are currently on public water supply which is supplied by 4 wells approximately 400 feet (ft) deep in the Vamoose-Ada aquifer. Residences located on or near the East Tank Farm obtain water from individual ground water wells set in the Barnsdall Formation which is much shallower than the Vamoose-Ada aquifer (EA 2020a).”*

EA Response: The revision has been made.

7. *Section 2.5: refer to section 3.2 of the RI and revise sentences consistent with the RI.*

EA Response: The revision has been made.

8. *Section 2.6:*

- *Remove the reference to the August 2020 sampling event. The August event is not summarized in the RI but rather in this document; therefore, the sample summary provided does not include the August 2020 field event. It should be listed out separately to summarize the data collected.*

EA Response: The August 2020 sampling event has been stated in a separate sentence.

- *The totals provided here are not consistent with that reported in the RI and need to be revised.*

EA Response: The number of samples was adjusted to reflect only those from the RI investigation.

- *The indoor air sampling statement needs to be deleted and replaced with the final conclusion from the HHRA Section 2.2.2.3 “Indoor air samples from existing buildings within the Lorraine Process Area and Wilcox Process Area did reveal COPCs. However, sub-slab soil gas samples did not reveal any COPCs below these buildings. As a result, the indoor air COPCs are likely a result of indoor source areas and not vapor intrusion from groundwater. Therefore, vapor intrusion from groundwater into existing buildings at the site is not considered complete, and indoor air COPCs were not assessed in the HHRA.”*

EA Response: The indoor air sampling statement has been revised per the comment.

9. *Section 2.6.1:*

- *The following statement is made: “The waste samples collected at the site and test pits were used to determine treatment and disposal alternatives for the waste materials under the Source Control ROD (EPA 2018). Therefore, the waste materials are not included in this FS.” This is incorrect. Although data were used to assist in development of the Source Control ROD, not all identified waste locations are addressed; therefore, all remaining waste data and locations should*



be compared to the results of the HHRA and ECO risk assessment and if found to exceed the COPCs then they will be included and evaluated in the FS.

EA Response: The following text was added to address the comment:

“The remaining waste materials not identified in the Source Control ROD are included in this FS.”

- *The following statement is made: Soil with lead concentrations exceeding 800 milligrams per kilogram (mg/kg) will be removed during the removal action.” This not totally accurate as all data points exceeding 800 mg/kg will not be removed. The only area being addressed for lead at concentrations >800mg/kg under the Source Control ROD is the lead additive area. Additionally, it is not a removal action. It is a remedial action.*

EA Response: The following text was added to address the comment:

“Soil within the lead additive area that has lead concentrations exceeding 800 milligrams per kilogram (mg/kg) will be removed during the remedial action. Since the remaining materials and impacted soil may still post unacceptable levels of risks under the current and future land use, they could be sampled for risk evaluation and characterization for disposal.”

10. Section 2.6.2: *This section does not accurately summarize the HHRA and the revisions that were made regarding benzo(a)pyrene. This section needs review and revision for consistency with the PRG Memo and the additional HHRA review based on a typical residential size plot.*

- *This Section should summarize the PRG Memo and the resulting risk and COCs. There should be no mention of screening values because the risk assessments are complete and PRGs are identified.*

EA Response: This section has been revised, and a subsection has been added to include an overall summary of the HHRA and the identification of chemicals of concern and media of concern. The section also summarizes and references the PRG memo. Additionally, a discussion of benzo(a)pyrene risk concerns and PRG calculations based upon the re-assessment by typical residential lot size has also been included.

11. Section 2.7:

- *paragraph three, sentence one: delete the words ‘majority of the’.*

EA Response: The text has been revised.

- *Refer to comment 2.6.2 above.*

EA Response: The comment is noted.



○ *LNAPL discussion:*

- *Please reference the data gap memo figure*
- *Additionally, soil samples collected of this material on both Lorraine and Wilcox at these locations should be discussed in terms of risk. The HHRA did not identify unacceptable risk associated with the described LNAPL. Look in RI. This appears to be a data gap, actual sample of the LNAPL on Lorraine?*
- *Is the LNAPL a source to the GW in the area mapped on Lorraine?*

EA Response: It is correct that a data gap exists for LNAPL on Lorraine and Wilcox. LNAPL was only found in one well that was plugged and abandoned and was not found anywhere else. Since the groundwater assessment is not complete, LNAPL cannot be confirmed as a source to the groundwater. Further groundwater investigation is needed but will not be discussed in this Soil Feasibility Study.

12. *Section 2.8: Based on the fact that there are data gaps, I assume the purpose of this section is to discuss the potential technologies that can be evaluated to address ground water; however, there needs to be a conclusion paragraph that further explains that based on data gaps the evaluation is taken no further and the remainder of the report focuses on soil.*

- *Two additional options would include natural attenuation, but more data is needed, as well as perhaps the pursuit of a TI waiver, which too needs additional data. Refer to the 10-29-20 email attached.*

EA Response: A separate section for potential groundwater technology has been added to the report to address these comments per the discussion during the meeting with EPA on 8 March 2021. In addition, a sentence has been added to indicate that, based on data gaps, the groundwater evaluation is taken no further and the remainder of the report focuses on soil.

EPA Comments Received via Email on 3 March 2020

1. *Section 3.3:*

- *Refer to the attached email for the discussion related to Benzo(a)pyrene. What were the results of the HH risk assessment related to residential properties and potential exposures to the concentrations of benzo(a)pyrene in these hot spot locations under a typical yard-size scenario? Specifically, the NE corner of Lorraine.*

EA Response: The results of the benzo(a)pyrene re-assessment based upon a typical residential lot size, instead of by exposure area, has been included in the text.



- *The PRG should not be a screening value, but should be based on an excess risk potential.*

EA Response: PRGs are based on calculations and shown in the PRG memo; the text has been revised.

- *Refer to the attached email for a discussion on the inclusion of the sediment.*

EA Response: The two areas of sediment (pond and West Tributary in Wilcox) that were sampled were found to contain lead. These sediment areas are often dry, which increases human exposure. The sediment is considered as soil in the HHRA. The text has been revised.

- *Based on these comments, volumes will need to be revised.*

EA Response: The volumes have been revised.

2. *Section 3.4:*

- *What is the basis for the statement “Additional Sampling is needed to refine the extent of the contaminated soils and delineation sampling will need to be conducted during the remedial design.” This site has over 400 surface/subsurface soil sample locations.*
- *Where are the areas that require additional sampling? Additional sampling for what parameter?*
- *What depth is used to calculate these volumes?*

EA Response: Any area within the investigation could require additional COC testing for purposes of confirming and delineating contamination. Further sampling can be done during the remedial design and remedial action. More information will be provided as part of a remedial design. The depths used to calculate volumes are based on the sample results and have been indicated in the text (i.e., in some areas it is 2 ft, and in others 2 to 6 ft).

3. *Figure 3-1: This figure needs to separate and simplify the information being presented.*

- *Remove the source control layer and place in a separate figure.*
- *The Lead PRG needs to be separated into residential and industrial.*
- *Revise because there is no Benzo(a)pyrene number.*
- *This figure needs to include the XRF data from the HQ investigation and ERT investigation.*
- *Location for consolidation area needs to be a separate figure.*
- *Why is the residential area on Wilcox so large. The home and surrounding yard are defined by the fence that surrounds it.*

EA Response: The figure has been revised. The residential area in Wilcox includes the house, storage tanks, and driveway per the discussion in the 8 March 2021 meeting.



4. *Table 3-1, ARARs Table: this is the same table provided in the screening memo. At this point this table should identify the specific list and citations associated with the technologies and alternatives being evaluated in the FS. Revise to identify the specific citations.*

- *ESA is not a TBC, but is an ARAR.*
- *TLV, ELV, and OSHA: These are not ARARs. OSHA is a regulation that must be met regardless and cannot be waived while the others are not enforceable promulgated worker safety standards. Please have your attorney review.*
- *Permits and Enforcement: CERCLA 121(e) is this the proper citation.*

EA Response: The table has revised to address the comments. ESA has been moved to under ARAR; TLV, ELV, and OSHA have been removed from the table; and CERCLA 121(e) is the correct citation.

5. *Section 4.2.2.2: Delete the first sentence of the second paragraph.*

EA Response: The sentence has been deleted.

6. *Section 4.2.2.4: retain in-situ solidification. This can work on metals and organics and can be used on the source areas. This may be tricky in that the FS is focusing on soil, not ground water and the use of in-situ may be more relevant to GW protection. Additionally, we should probably include & evaluate a treatment alternative. Let's discuss.*

EA Response: Based on the 8 March 2021 meeting with EPA and per EPA directions, *in situ* solidification and stabilization of soil will not be retained in the technologies. However, a sentence has been added in the report that states that no treatment technologies are included in the soil alternatives based on the site conditions.

7. *For all soil alternatives include the following bulleted information. Note this may cause cost estimate updates and revisions, particularly the inclusion of 5-yr reviews.*

- *During excavation activities, dust control measures, such as water spray, will be used to mitigate fugitive dust. Air monitoring equipment will be used to establish a safety perimeter based on the presence of potential vapors and/or dust to ensure the health and safety of onsite workers, the surrounding community, and the environment. Onsite workers directly involved in the excavation may be required to use respirators.*
- *After removal of source materials, the excavated area will be documented and sampled to determine area, depth, cubic yards removed, and concentrations of soil at base and sides of excavation. The excavated areas will be backfilled with clean soil from an offsite location and re-vegetated. All excavation areas will be graded for drainage and appropriate erosion controls implemented.*
- *All trucks will be decontaminated prior to leaving the Site, will be tarped to contain source materials within the bed of the truck, and will only transport material via the preapproved transportation route.*
- *All alternatives will require 5-yr reviews and ICs.*



EA Response: The comments have been considered in the cost estimate of alternatives.

8. *Alternatives 3&4: Please include further discussion on the location of the consolidation area and why this location is appropriate as well as the volume calculations completed to determine the appropriate size, area, depth, etc of the consolidation area dimensions as well as the cap. Further discuss any other assumptions made regarding this area.*

EA Response: The location of the consolidation area was chosen due to its location away from the creek and residential areas, and as a central location. More assumptions regarding the consolidation area have been added in the report.

9. *Section 6.3: this text should mirror that provided in the table. Review for consistency.*

EA Response: The following text was added to mirror the information provided in Table 6-2, “Alternative S-1 would not provide long-term effectiveness and permanence. Alternative S-2 would provide the best long-term effectiveness and permanence because all contaminated materials are removed and disposed of offsite. Alternatives S-3 and S-4 would only provide long-term effectiveness and permanence if certain conditions are met. Since the contaminated materials would remain onsite, S-3 and S-4 would require long-term monitoring and maintenance to protect the contaminated materials, eliminate direct exposure to all receptors, and prevent leaching into the groundwater.”

- *6.3.4: include text that states none of the alternatives involve treatment; therefore, TMV are not reduced through treatment.*

EA Response: Section 6.3.4 was revised as follows, “All alternatives except Alternative S-1 reduce the mobility of the contaminated materials. None of the alternatives involve treatment, therefore a reduction in toxicity and volume of contaminated soil is not expected.”

10. *Table 6-1, S2, 4c: Please reword for clarity. “This alternative will reduce toxicity, mobility, and volume of the COCs with respect to onsite conditions because the contamination will be physically removed from the site; not treated.”*

EA Response: The revision has been made.

11. *Table 6-1, S3 & S4, 4c: Please reword for clarity. “This alternative will reduce mobility of the COCs with respect to onsite conditions because the contamination will be physically removed and placed in a containment/capped area. The toxicity and volume remain unchanged.”*

EA Response: The revision has been made.

12. *Table 6-1, S3, 6c: Please revise to indicate that a revised design ‘may’ be required and remove the reference to treatment since no ex-situ treatment is being considered.*

EA Response: The revision has been made.



13. Cost Summaries:

- *S2: It is noted that there is a cost for 18050402 Seeding, Vegetative Cover as well as Cleanup and Landscaping. The 18050402 Seeding, Vegetative Cover is duplicative.*

EA Response: The cost for 18050402 has been removed.

- *What is the assumed distance for the backfill location?*

EA Response: The backfill location is assumed to be 10 miles one way.

- *Development estimates for the 5-yr review report and Site Closeout Documentation (assumed to be the RA report) are lower than costs for actual reports completed for sites of similar complexity. What are the assumptions used to develop this estimate and the level of effort needed to complete these reports?*

EA Response: The site complexity is set to be low in the estimate program. One kickoff meeting is assumed, and the draft RA Report will be prepared followed by draft final and final RA Reports.

- *The number of samples estimated for confirmation of reaching remedial goals is listed as 50. What assumptions were used to estimate this number? For example, size of excavation area, 5-pt composites at base and along sidewalls, sample area assumed to be how large?*

EA Response: The number of samples were assumed to be 200, and the number of composite samples to be 50. The number of samples has been changed after evaluating the areas of exceedances more in detail. One composite sample is assumed per 50 ft by 50 ft for bottom confirmation sampling. Depending on the shape of the exceedance areas, side wall samples are assumed ranging from 5 to 18 samples at each exceedance area to ensure at least one side wall sample is collected per each wall within the exceedance area.

- *It is noted that the volume used for excavation is 25,491 vs the 25,500 as noted in the text. It is also noted that the estimated cubic yards when adding and converting cubic feet is closer to 25,520cy than 25,500cy. (As noted in the comments above, the inclusion of areas to be addressed due to the presence of benzo(a)pyrene will revise this total.)*

EA Response: The volume has been changed and has been kept consistent in both the cost estimate and text.

- *S3: The excavation work includes 17020416 12CY dump truck and then there is the estimate for load and haul. These appear to be duplicates.*

EA Response: Load and haul has been deleted.



DEQ Comments Received via Email on 26 February 2020

1. *Page 4, Section 2.1: Refinery Road is also referred to as E0810. Please include.*

EA Response: The following has been added to section 2.1 to address this comment:

“The North Tank Farm is located north of Refinery Road, also referred to as E0810....”

2. *Page 5, Section 2.3, Third paragraph: There is no residence or building in the Loading Dock Area. A church, residence, and playground are located within the Lorraine Process Area, not the Loading dock Area.*

EA Response: The third paragraph has been revised as follows:

“There are seven residential buildings/houses at the site, one in the North Tank Farm, one in the Lorraine Process Area, two in the Wilcox Process Area, and three in the East Tank Farm. The houses in the Lorraine Process Area and Wilcox Process Area are currently unoccupied while the rest of the houses in the other areas are occupied. A church and a playground are located in the Lorraine Process Area.”

3. *Page 6, Section 2.4, First two sentences: “Change residential buildings and houses” to “parcels”, “unused” could be omitted.*

EA Response: The section has been revised to address the EPA comment (please see the response to the EPA comment No. 6 received on 24 February 2021).

4. *Page 6, Section 2.4, Second paragraph: Please revise the last sentence. Those residences obtain their water from private wells located on their property (80-120 feet deep).*

EA Response: The revision has been made.

5. *Page 7, Section 2.6.1, Second paragraph: Please revise this last paragraph. Not all waste materials on the site will addressed under the Source Control ROD. Remaining materials (waste material and contaminated soils) should be addressed in the FS.*

EA Response: The text has been revised to address the comment.

6. *Page 8, Section 2.6.3: There are human health concerns to exposure to sediment in the West Tributary and associated pond.*

EA Response: The text has been revised. Please see the response to the EPA comment No. 1 received on 3 March 2021.



7. *Section 2.6.4: a. First sentence: There are also risks to groundwater in the Lorraine Process area. b. DEQ considers groundwater associated with a perched shallow groundwater unit as groundwater that could be utilized for domestic use.*

EA Response: The first sentence was revised as follows:

“The HHRA identified that there were potential risks for exposure to the groundwater associated with the perched shallow groundwater unit, which could be utilized for domestic use, in the Wilcox Process Area and Lorraine Process Area.”

8. *Page 10, Section 2.6.4, Last paragraph: Regarding arsenic “exceedance” in groundwater, was this determined to be an exceedance beyond what may be naturally occurring? Arsenic background levels tend to be higher than EPA RSL criteria in this region of Oklahoma. A background concentration of ground water in the Bristow area should be established.*

EA Response: Based on sampling performed by the Oklahoma Water Resources Board from 2014, the arsenic levels in the Vamoosa-Ada aquifer ranged from less than 1 microgram per liter (µg/L) to 4.1 µg/L, with an average of 1.28 µg/L. The EPA RSL for arsenic is 0.052 µg/L, therefore background levels naturally exceed the RSL. Arsenic levels found in the August 2020 sampling event ranged from 2.23 µg/L to 38.5 µg/L, which exceed the background level found by the Oklahoma Water Resources Board.

9. *Page 10, Section 2.7: Second paragraph, First sentence: “Source materials were historically released from previous refinery operations” should be revised to say, “Source materials are associated with releases from historical refinery operations”.*

EA Response: The revision has been made.

10. *DEQ prefers Alternative S-2, Soil excavation and offsite disposal. Will discuss?*

EA Response: The FS does not select an alternative, and the preferred alternative may be selected after discussion between EPA and DEQ.

11. *Waste materials still pose a risk to human health and the environment and should be addressed.*

EA Response: Based upon the results of the HHRA, environmental media identified with the potential risk concerns was included for consideration in this FS. The HHRA did not evaluate areas of the site that have been identified in the Source Control ROD. The text has been revised to include that the waste remaining after the source control activities will be addressed in the FS.



12. Figures:

- a. Figure 2.1: Site road labels for N/S and E/W should be added*
- b. Figure 2.2: Are Wetland # and WUS#'s necessary? Maybe delete #'s for simplification*
- c. Figure 2.2: Label N/S Road and Refinery Rd/E0810 RD*
- d. Figure 2.2: The pond located south of the western most residence within the East Tank Farm is not indicated on the Figure. Please add.*
- e. Figure 2.3: "On-site Building" (brown shaded) is referend to "Residence" (yellow shaded) or "Church" (Orange shaded) in Figure 2.2. Please be consistent and revise to clarify.*
- f. Figure 3-1: Legend and corresponding map features are confusing and hard to see. Multiple features are similar to another in color or shape and should be revised to make less confusing and easier to interpret.*

EA Response: The figures have been revised to address the comments.